Access DB# 267258

SEARCH REQUEST FORM

Scientific and Technical Information Center

Requester's Full Name: Gregg Cantelmo Examiner #: 75777 Date: 11-14-06
Art Unit: 1745 Phone Number 30 2-1283 Serial Number: 10/699,484
Mail Box and Bldg/Room Location: CP1 Results Format Preferred (circle): PAPER DISK E-MAIL

If more than one search is submitted, please prioritize searches in order of need.

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Please provide a detailed statement of the search topic, and describe as specifically as possible the subject matter to be searched. Include the elected species or structures, keywords, synonyms, acronyms, and registry numbers, and combine with the concept or utility of the invention. Define any terms that may have a special meaning. Give examples or relevant citations, authors, etc, if known. Please attach a copy of the cover sheet, pertinent claims, and abstract.

Title of Invention: _____

Inventors (please provide full names): _____

_____

Earliest Priority Filing Date: _____

For Sequence Searches Only *Please include all pertinent information (parent, child, divisional, or issued patent numbers) along with the appropriate serial number.*

Please see attached.

****

STAFF USE ONLY	Type of Search		Vendors and cost where applicable	
Searcher: EL	NA Sequence (#)		STN	$ 134.33
Searcher Phone #:	AA Sequence (#)		Dialog	
Searcher Location:	Structure (#)	✓	Questel/Orbit	
Date Searcher Picked Up:	Bibliographic		Dr.Link	
Date Completed: 11-14-06	Litigation		Lexis/Nexis	
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Online Time: 60	Other		Other (specify)	

PTO-1590 (8-01)

Banks, Kendra 207258

From: GREGG CANTELMO [gregg.cantelmo@uspto.gov]
Sent: Monday, November 13, 2006 6:35 PM
To: STIC-EIC1700
Subject: Database Search Request, Serial Number: 10/699484

Requester:
GREGG CANTELMO (P/1745)
Art Unit:
GROUP ART UNIT 1745
Employee Number:
75777
Office Location:
REM 06C81
Phone Number:
(571)272-1283
Mailbox Number:
Rem 6C81

Case serial number:
10/699484
Class / Subclass(es):

Earliest Priority Filing Date:

Format preferred for results:
Paper
Search Topic Information:
Please search the composition of the claims. As amended the claims now require each of Li, Ni, Mn, Co, M (M group includes at least one of Mg, Zn, Al, B, Zr Ti) O and X (X group includes at least one of F, S, Cl and I) to be present within the claimed product.
Special Instructions and Other Comments:

Remarks/Arguments begin on page 7 of this document.

Please amend the application as follows:

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently Amended) A positive electrode material of substituted lithium nickel-manganese oxides for a non-aqueous lithium cell, comprising a composition of $Li_{1+x}Ni_{\alpha}Mn_{\beta}Co_{\gamma}M'_{\delta}O_{2-z}X_z$ (M'=Mg,Zn,Al,Ga,B,Zr,Ti; X=F,S,Cl,I), wherein x is between ~~about~~ a value greater than 0 and about 0.333, α is between about 0.2 and 0.6, β is between about 0.2 and 0.667, γ is between ~~about~~ a value greater than 0 and about 0.333, δ is between ~~about~~ a value greater than 0 and about 0.2, and z is between ~~about~~ a value greater than 0 and about 0.5.

2. (Currently Amended) The positive electrode material of claim 1, wherein the composition comprises $Li_{1+x}Ni_{\alpha}Mn_{\beta}O_{2-z}F_z$, and wherein x is between ~~about~~ a value greater than 0 and about 0.333, α is between about 0.2 and 0.6, β is between about 0.2 and 0.667, and z is between ~~about~~ a value greater than 0 and about 0.5.

3. (Currently Amended) The positive electrode material, of claim 1, wherein the composition comprises $Li_{1+x}Ni_{\alpha}Mn_{\beta}Co_{\gamma}O_{2-z}F_z$, and wherein x is between ~~about~~ a value greater than 0 and about 0.333, α is between about 0.2 and 0.6, β is between about 0.2 and 0.667, γ is between about 0.01 and 0.333, and z is between ~~about~~ a value greater than 0 and about 0.5.

4. (Currently Amended) The positive electrode material, of claim 1, wherein the composition comprises $Li_{1+x}Ni_{\alpha}Mn_{\beta}Al_{\delta}O_{2-z}F_z$, and wherein x is between ~~about~~ a value greater than 0 and about 0.333, α is between about 0.2 and 0.6, β is between about 0.2 and 0.667, δ is between about 0.01 and 0.2, and z is between ~~about~~ a value greater than 0 and about 0.5.

5. (Currently Amended) The positive electrode material of claim 1, wherein the composition comprises $Li_{1+x}Ni_{\alpha}Mn_{\beta}Ti_{\delta}O_{2-z}F_z$, wherein x is between ~~about~~ a value greater than 0 and about 0.333, α is between about 0.2 and 0.6, β is between about 0.2 and 0.667, δ is between about 0.01 and 0.2, and z is between ~~about~~ a value greater than 0 and about 0.5.

6. (Currently Amended) The positive electrode material of claim 1, wherein the composition comprises $Li_{1+x}Ni_{\alpha}Mn_{\beta}Co_{\gamma}Al_{\delta}O_{2-z}F_z$, and wherein x is between ~~about~~ a value

greater than 0 and about 0.333, α is between about 0.2 and 0.6, β is between about 0.2 and 0.667, γ is between about 0.01 and 0.333, δ is between about 0.01 and 0.2, and z is between ~~about~~ a value greater than 0 and about 0.5.

7. (Currently Amended) The positive electrode material of claim 1, wherein the composition comprises $Li_{1+x}Ni_{\alpha}Mn_{\beta}Co_{\gamma}Ti_{\delta}O_{2-z}F_z$, and wherein x is between ~~about~~ a value greater than 0 and about 0.333, α is between about 0.2 and 0.6, β is between about 0.2 and 0.667, γ is between about 0.01 and 0.333, δ is between about 0.01 and 0.2, and z is between ~~about~~ a value greater than 0 and about 0.5.

8. (Original) The electrode material of claim 1, wherein the electrode material is formed by a solid state reaction process.

9. (Original) The electrode material of claim 1, wherein the electrode material is formed by an aqueous solution based process.

10. (Original) The electrode material of claim 1, wherein the electrode material is formed by a sol-gel process.

11. (Original) The electrode material of claim 9, wherein the electrode material prepared by the steps of:

dissolving appropriate amounts of lithium hydroxide, lithium fluoride, nickel hydroxide, cobalt hydroxide, and M'-hydroxide or M'-nitrate; M'=Mg,Zn,Al,Ga in distilled water whose pH was adjusted with nitric acid to form a first solution;

adding an aqueous solution of manganese acetate to the first solution to form a second solution;

refluxing the second solution in a flask attached with a condenser at about 80°C for about 12-24 hours;

evaporating the second solution in a rotary vacuum evaporator to form a gel precursor;

eliminating organic contents from the gel precursor at about 400°C for about 2 hours to form a powder; and

calcining the powder at about 900-1000°C for about 10-24 hours in either an air or an oxygen containing atmosphere.

12. (Original) The electrode material of claim 10, wherein the electrode material prepared by the steps of:

dissolving appropriate amounts of lithium acetate, lithium fluoride, nickel acetate, manganese acetate, cobalt acetate, and M'-acetate or M'-nitrate; M'=Mg,Zn,Al,Ga in distilled water to form a first solution;

added the first solution to a glycolic/tartaric acid solution that is used as a chelating agent to form a second solution;

adjusting the pH of the second solution to about 7 using ammonium hydroxide, resulting in a gel precursor;

decomposing the gel precursor at about 4500C for about 5 hours in air to form a decomposed power; and

firing the decomposed powder at about 900-1000°C for about 10-24 hours in an air or an oxygen containing atmosphere,

wherein the dissolving, adding, and adjusting steps occur under continuous stirring and heating.

13. (Original) The electrode material of claim 9, wherein the electrode material is prepared by the steps of:

mixing appropriate amounts of lithium hydroxide (or lithium carbonate), lithium fluoride, (Ni,Mn,Co)-hydroxide [or (Ni,Mn,Co)-carbonate], M'-hydroxide (or M' oxide; M'= Mg,Zn,Al,Ga,B,Zr,Ti);

calcined the mixed materials at about 450~550°C for about 12-30 hours in air; and

calcining the mixed materials at about 900-1000°C for about 10-24 hours either in air or in an oxygen-containing atmosphere.

14. (Currently Amended) A non-aqueous lithium cell comprising:

a negative electrode;

a non-aqueous electrolyte; and

a positive electrode,

wherein the positive electrode has a composition of $Li_{1+x}Ni_{\alpha}$ $Mn_{\beta}Co_{\gamma}M'_{\delta}O_{2-z}X_z$ (M'=Mg,Zn,Al,Ga,B,Zr,Ti; X=F,S,Cl,I), wherein x is between ~~about~~ a value greater than 0 and about 0.333, α is between about 0.2 and 0.6, β b is between about 0.2 and 0.667, γ c is between ~~about~~ a value greater than 0 and about 0.333, δ is between ~~about~~ a value greater than 0 and about 0.2, and z is between ~~about~~ a value greater than 0 and about 0.5, and wherein ~~x, α, β, γ, δ, and z are controlled so as to fix the~~ oxidation states of Ni, Mn, and Co ~~as~~ are Ni^{2+}, Mn^{4+}, and Co^{3+}, respectively.

15. (Currently Amended) A positive electrode material made of substituted lithium nickel-manganese oxides for non-aqueous lithium cell, comprising:

a composition of $Li_{1+x}Ni_{\alpha}Mn_{\beta}Co_{\gamma}M'_{\delta}O_{2-z}X_z$ (M'=Mg,Zn,Al,Ga,B,Zr,Ti; X=F,S,Cl,I), wherein x, α, β, γ c, δ, and z are ~~about~~ a value greater than 0 and are controlled so as to fix the oxidation states of Ni, Mn, and Co as Ni^{2+}, Mn^{4+}, and Co^{3+}, respectively.

16. (Currently Amended) A positive active material for a secondary lithium cell, comprising:

a core comprising at least one composition of $Li_{1+x}Ni_{\alpha}Mn_{\beta}Co_{\gamma}M'_{\delta}O_{2-z}X_z$ (M'=Mg,Zn,Al,Ga,B,Zr,Ti; X=F,S,Cl,I), wherein x is between ~~about~~ a value greater than 0 and about 0.333, α is between about 0.2 and 0.6, β is between about 0.2 and 0.667, γ is between

~~about~~ a value greater than 0 and about 0.333, δ is between ~~about~~ a value greater than 0 and about 0.2, and z is between ~~about~~ a value greater than 0 and about 0.5; and

either a surface layer or a surface phase on the core, comprising at least one surface coating material from a coating material source selected from the group consisting of alkoxides, hydroxides, oxides and mixtures thereof,

wherein the surface-coated compound is heat-treated to form hydroxides or amorphous oxides on the compound surface.

17. (Original) The positive active material of claim 16, wherein the amount of the surface coating material source is between about 0.05 and 10 percent by weight based upon the weight of the positive active material.

18. (Original) The positive active material of claim 16, wherein the coating element of the surface coating material source comprises at least one element selected from the group consisting of Al, Bi, Ga, Ge, In, Mg, Pb, Si, Sn, Ti, Tl, Zn, Zr.

19. (Original) The positive active material of claim 18, wherein the surface coating material source comprises Al-isopropoxide, zinc methoxide or indium-isopropoxide and is dissolved in ethanol.

20. (Original) The positive active material of claim 16, wherein the heat-treating process is carried out at a temperature ranging from about 100 to 500°C for a duration ranging from about 1 to 24 hours.

ABSTRACT

[0044] A number of materials with the composition $Li_{1+x}Ni_{\alpha}Mn_{\beta}Co_{\gamma}M'_{\delta}O_{2-z}F_z$ (M' = Mg,Zn,Al,Ga,B,Zr,Ti) for use with rechargeable batteries, wherein x is between about 0 and 0.3, α is between about 0.2 and 0.6, β is between about 0.2 and 0.6, γ is between about 0 and 0.3, δ is between about 0 and 0.15, and z is between about 0 and 0.2. Adding the above metal and fluorine dopants affects capacity, impedance, and stability of the layered oxide structure during electrochemical cycling.

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L1            0 S (LI (L) NI (L) MN (L) CO (L) (MG OR ZN OR GA OR AL OR B

     FILE 'REGISTRY' ENTERED ON 14 NOV 2006
L2         1272 S (LI (L) NI (L) MN (L) CO (L) O)/ELS
L3          423 S L2 (L) (MG OR ZN OR GA OR AL OR B OR ZR OR TI)/ELS
L4           56 S L2 (L) (F OR S OR CL OR I)/ELS
L5           18 S L3 AND L4

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L7   ANSWER 1 OF 10  ZCAPLUS  COPYRIGHT 2006 ACS on STN
2006:1093729  Methodd of fabrication of cathode active material coated
     with fluorine compound for lithium secondary batteries. (Daejung
     Chemicals & Metals Co., Ltd., S. Korea; Sun, Yang Kook; Kim, Woo
     Seong; Han, Jung Min).  PCT Int. Appl. WO 2006109930 A1 20061019,
     31pp.  DESIGNATED STATES: W:  AE, AG, AL, AM, AT, AU, AZ, BA, BB,
     BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC,
     EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE,
     KG, KM, KN, KP, KZ, LC, LK, LR, LS, LT, LU, LV, LY, MA, MD, MG, MK,
     MN, MW, MX, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC,
     SD, SE, SG, SK, SL, SM, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ,
     VC, VN, YU, ZA, ZM; RW: AT, BE, BF, BJ, CF, CG, CH, CI, CM, CY, DE,
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DK, ES, FI, FR, GA, GB, GR, IE, IS, IT, LU, MC, ML, MR, NE, NL, PT, SE, SN, TD, TG, TR. (English). CODEN: PIXXD2. APPLICATION: WO 2006-KR987 20060317. PRIORITY: KR 2005-31309 20050415; KR 2006-23501 20060314.

AB Disclosed herein is a cathode active material coated with a fluorine compd. for lithium secondary batteries. The cathode active material is structurally stable, and improves the charge-discharge characteristics, cycle characteristics, high-voltage characteristics, high-rate characteristics and thermal stability of batteries.

IT **912841-74-8 912841-78-2 912841-79-3**
912841-82-8
(method of fabrication of cathode active material coated with fluorine compd. for lithium secondary batteries)

RN 912841-74-8 ZCAPLUS

CN Cobalt lithium magnesium manganese nickel fluoride oxide (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	x	17778-80-2
F	x	14762-94-8
Co	x	7440-48-4
Ni	x	7440-02-0
Mn	x	7439-96-5
Mg	x	7439-95-4
Li	x	7439-93-2

RN 912841-78-2 ZCAPLUS

CN Cobalt lithium manganese nickel zinc fluoride oxide (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	x	17778-80-2
F	x	14762-94-8
Zn	x	7440-66-6
Co	x	7440-48-4
Ni	x	7440-02-0
Mn	x	7439-96-5
Li	x	7439-93-2

RN 912841-79-3 ZCAPLUS

CN Cobalt lithium magnesium manganese nickel sulfur oxide (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	x	17778-80-2
S	x	7704-34-9
Co	x	7440-48-4
Ni	x	7440-02-0
Mn	x	7439-96-5
Mg	x	7439-95-4
Li	x	7439-93-2

RN 912841-82-8 ZCAPLUS
CN Cobalt lithium manganese nickel sulfur zinc oxide (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	x	17778-80-2
S	x	7704-34-9
Zn	x	7440-66-6
Co	x	7440-48-4
Ni	x	7440-02-0
Mn	x	7439-96-5
Li	x	7439-93-2

IT **912841-74-8 912841-78-2 912841-79-3**
912841-82-8
(method of fabrication of cathode active material coated with fluorine compd. for lithium secondary batteries)

L7 ANSWER 2 OF 10 ZCAPLUS COPYRIGHT 2006 ACS on STN
2005:558827 Document No. 143:133818 Fluidized bed catalyst for preparing acrylonitrile by ammoxidation of propylene. Xie, Guohuang; Chen, Xin; Wu, Lianghua (China Petroleum and Chemical Corporation, Peop. Rep. China; Shanghai Research Institute of Petrochemical Technology, China Petroleum and Chemical Corporation). Faming Zhuanli Shenqing Gongkai Shuomingshu CN 1413979 A 20030430, 8 pp. (Chinese). CODEN: CNXXEV. APPLICATION: CN 2001-131945 20011022.
AB The catalyst is Mo12BiaFebNicSdXeYfZgOx (X = Li, K, Rb, Cs, and/or Sm; Y = Co, Mg, Pb, Mn, Ca, Sn, Zn, and/or Cu; Z = La, Ce, B, P, and/or Cr; a = 0.1-2.5; b = 0.1-7.0; c = 0.1-10; d = 0.005-0.5; e = 0.01-1.5; f = 0.1-6.0; g = 0.01-4.0; and x = no. for balancing the chem. valence) loaded on SiO2, and the content of SiO2 in the catalyst is 40-60%.
IT **858364-38-2**
(fluidized bed catalyst for prepg. acrylonitrile by ammoxidn. of

propylene)

RN 858364-38-2 ZCAPLUS

CN Bismuth cerium cesium chromium cobalt iron lithium magnesium manganese molybdenum nickel phosphorus sodium sulfur oxide (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	x	17778-80-2
P	x	7723-14-0
S	x	7704-34-9
Bi	x	7440-69-9
Co	x	7440-48-4
Cr	x	7440-47-3
Cs	x	7440-46-2
Ce	x	7440-45-1
Na	x	7440-23-5
Ni	x	7440-02-0
Mo	x	7439-98-7
Mn	x	7439-96-5
Mg	x	7439-95-4
Li	x	7439-93-2
Fe	x	7439-89-6

IT **858364-38-2**
(fluidized bed catalyst for prepg. acrylonitrile by ammoxidn. of propylene)

L7 ANSWER 3 OF 10 ZCAPLUS COPYRIGHT 2006 ACS on STN

2005:493821 Document No. 143:29509 Process and reactor for preparation of cathode active material for lithium secondary battery. Sun, Yang Kook; Lee, Myoung Hun; Kang, Yoon Jung; Kim, Gil Ho (Hanyang Hak Won Co., Ltd., S. Korea). PCT Int. Appl. WO 2005053064 A1 20050609, 32 pp. DESIGNATED STATES: W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW; RW: AT, BE, BF, BJ, CF, CG, CH, CI, CM, CY, DE, DK, ES, FI, FR, GA, GB, GR, IE, IS, IT, LU, MC, ML, MR, NE, NL, PT, SE, SN, TD, TG, TR. (English). CODEN: PIXXD2. APPLICATION: WO 2004-KR2980 20041117. PRIORITY: KR 2003-84702 20031126.

AB The invention relates to a cathode active material for a lithium secondary battery and a process for prepg. the same. In accordance with the present invention, the cathode active material having a high packing d. was designed and synthesized and thus provided is a

cathode active material for a lithium secondary battery exhibiting structural stability such as improved characteristics for charge/discharge, service life and high-rate and thermal stability, by modifying surface of the electrode active material with amphoteric or basic compds. capable of neutralizing acid produced around the cathode active material.

IT **837287-95-3P**
(process and reactor for prepn. of cathode active material for lithium secondary battery)

RN 837287-95-3 ZCAPLUS

CN Cobalt lithium magnesium manganese nickel fluoride oxide (Co0.33LiMg0.04Mn0.29Ni0.33F0.08O1.92) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	1.92	17778-80-2
F	0.08	14762-94-8
Co	0.33	7440-48-4
Ni	0.33	7440-02-0
Mn	0.29	7439-96-5
Mg	0.04	7439-95-4
Li	1	7439-93-2

IT **837287-95-3P**
(process and reactor for prepn. of cathode active material for lithium secondary battery)

L7 ANSWER 4 OF 10 ZCAPLUS COPYRIGHT 2006 ACS on STN

2005:422904 Document No. 142:466485 Substituted lithium nickel oxides as potential cathode materials for secondary lithium batteries. / Jordy, Christian; Audry, Claudette; Boeuve, Jean-Pierre; Biensan, Philippe; Lecerf, Andre (Saft, Fr.). Eur. Pat. Appl. EP 1531506 A1 20050518, 16 pp. DESIGNATED STATES: R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR, BG, CZ, EE, HU, PL, SK, HR. (French). CODEN: EPXXDW. APPLICATION: EP 2004-292396 20041008. PRIORITY: FR 2003-13519 20031117.

AB Electrochem. active battery cathode material is prepd. by at least partial substitution of LiNiO2 crystd. in a rhombohedral structure of general formula Li(Ni1-yzCoxMnyLizMt)O2-eFe (x = 0-0.70, y = 0.05-0.50, z = 0-0.20, t = 0-0.30, e = 0.01-0.50, and 1-x-y-z ≥0.20); in which M is selected from Mg, Al, B, Ti, Si, Zr, Fe, Zn, and Cu. The cathode material may also contain <3 wt.% of a second phase of active material. The battery anode is prepd. from a Li alloy or a carbonaceous material capable of intercalating Li (e.g., graphite, coke, carbon black, and glassy carbon).

IT **851786-65-7 851786-68-0 851786-69-1**

851786-71-5
(cathodes; substituted lithium nickel oxides as potential cathode materials for secondary lithium batteries)

RN 851786-65-7 ZCAPLUS
CN Cobalt lithium magnesium manganese nickel fluoride oxide (Co0.16LiMg0.02Mn0.3Ni0.52F0.13O1.87) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	1.87	17778-80-2
F	0.13	14762-94-8
Co	0.16	7440-48-4
Ni	0.52	7440-02-0
Mn	0.3	7439-96-5
Mg	0.02	7439-95-4
Li	1	7439-93-2

RN 851786-68-0 ZCAPLUS
CN Aluminum cobalt lithium manganese nickel borate fluoride oxide (Al0.02Co0.15Li1.1Mn0.35Ni0.35(BO3)0.03F0.2O1.71) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	1.71	17778-80-2
F	0.2	14762-94-8
BO3	0.03	14213-97-9
Co	0.15	7440-48-4
Ni	0.35	7440-02-0
Mn	0.35	7439-96-5
Li	1.1	7439-93-2
Al	0.02	7429-90-5

RN 851786-69-1 ZCAPLUS
CN Cobalt lithium manganese nickel titanium fluoride oxide (Co0.15Li1.1Mn0.35Ni0.35Ti0.05F0.2O1.8) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	1.8	17778-80-2
F	0.2	14762-94-8
Co	0.15	7440-48-4
Ti	0.05	7440-32-6
Ni	0.35	7440-02-0
Mn	0.35	7439-96-5

Li	1.1	7439-93-2

RN 851786-71-5 ZCAPLUS
CN Cobalt lithium manganese nickel zinc fluoride oxide (Co0.15Li1.1Mn0.35Ni0.35Zn0.05F0.2O1.8) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	1.8	17778-80-2
F	0.2	14762-94-8
Zn	0.05	7440-66-6
Co	0.15	7440-48-4
Ni	0.35	7440-02-0
Mn	0.35	7439-96-5
Li	1.1	7439-93-2

IT **851786-65-7 851786-68-0 851786-69-1 851786-71-5**
(cathodes; substituted lithium nickel oxides as potential cathode materials for secondary lithium batteries)

L7 ANSWER 5 OF 10 ZCAPLUS COPYRIGHT 2006 ACS on STN
2005:283427 Document No. 142:358027 Composite oxide containing lithium, nickel, cobalt, manganese, and fluorine, its manufacture, and secondary lithium battery using the oxide. Suhara, Manabu; Mihara, Takuya; Yajima, Sumitoshi; Ueda, Koichiro; Wakasugi, Yukimitsu (Seimi Chemical Co., Ltd., Japan). PCT Int. Appl. WO 2005028371 A1 20050331, 21 pp. DESIGNATED STATES: W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW; RW: AT, BE, BF, BJ, CF, CG, CH, CI, CM, CY, DE, DK, ES, FI, FR, GA, GB, GR, IE, IT, LU, MC, ML, MR, NE, NL, PT, SE, SN, TD, TG, TR. (Japanese). CODEN: PIXXD2. APPLICATION: WO 2004-JP9648 20040707. PRIORITY: JP 2003-323321 20030916.

AB The oxide has a R-3m rhombohedral structure and is represented by: LipNixMn1-x-yCoyO2-qFq (p = 0.98-1.07; x = 0.3-0.5; y = 0.1-0.38; and 0< q≤ 0.05); where the oxide, on its CuKα x ray diffraction pattern, has a half peak width 0.12-0.25° of its (110) face at 2θ = 65±0.5°. The oxide is manufd. by dry-mixing Ni-Co-Mn composite oxyhydroxide aggregated particles with Li2CO3 and a F contg. compd.; and firing the mixt. in an O contg. atm. The battery has a cathode, using the above oxide.

IT **848872-69-5P**

(compns. and manuf. of Li-Ni-Co-Mn composite fluoride oxides for secondary lithium battery cathodes)

RN 848872-69-5 ZCAPLUS

CN Cobalt lithium magnesium manganese nickel fluoride oxide (Co0.33Li1.04Mg0.01Mn0.33Ni0.33F0.01O1.99) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	1.99	17778-80-2
F	0.01	14762-94-8
Co	0.33	7440-48-4
Ni	0.33	7440-02-0
Mn	0.33	7439-96-5
Mg	0.01	7439-95-4
Li	1.04	7439-93-2

IT **848872-69-5P**

(compns. and manuf. of Li-Ni-Co-Mn composite fluoride oxides for secondary lithium battery cathodes)

L7 ANSWER 6 OF 10 ZCAPLUS COPYRIGHT 2006 ACS on STN

2005:182996 Document No. 142:264407 Cathode active mass powder for secondary lithium battery. Suhara, Manabu; Mihara, Takuya; Udea, Koichiro; Wakasugi, Yukimitsu (Seimi Chemical Co., Ltd., Japan). PCT Int. Appl. WO 2005020354 A1 20050303, 20 pp. DESIGNATED STATES: W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW; RW: AT, BE, BF, BJ, CF, CG, CH, CI, CM, CY, DE, DK, ES, FI, FR, GA, GB, GR, IE, IT, LU, MC, ML, MR, NE, NL, PT, SE, SN, TD, TG, TR. (Japanese). CODEN: PIXXD2. APPLICATION: WO 2004-JP12015 20040820. PRIORITY: JP 2003-208311 20030821.

AB The title powder is formed by aggregating particles of a lithium composite oxide LipNixCoyMnzMqO2-aFa [M = transition metal element (excluding Ni, Co and Mn), Al, or alk. earth metal element; p = 0.9-1.1; x = 0.2-0.8; y = 0-0.4; z = 0-0.5; (y+z) > 0; q = 0-0.05; (2-a) = 1.9-2.1; (x + y + z + q) = 1; and a = 0-0.02]; has an av. particle diam. D50 3-15 μm; and contains a 1st granular powder having compressive breaking strength ≥50 MPa and a 2nd granular powder having compressive breaking strength <40 MPa in such an amt. that the wt. ratio of the 1st granular powder to the 2nd granular powder is 50-90:10-50.

IT **846020-47-1**

(cathodes contg. different compressive breaking strength lithium

cobalt manganese nickel oxides for secondary lithium batteries)
RN 846020-47-1 ZCAPLUS
CN Cobalt lithium magnesium manganese nickel fluoride oxide (Co0.33LiMg0.01Mn0.33Ni0.33F0.01O1.99) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	1.99	17778-80-2
F	0.01	14762-94-8
Co	0.33	7440-48-4
Ni	0.33	7440-02-0
Mn	0.33	7439-96-5
Mg	0.01	7439-95-4
Li	1	7439-93-2

IT **846020-47-1**
(cathodes contg. different compressive breaking strength lithium cobalt manganese nickel oxides for secondary lithium batteries)

L7 ANSWER 7 OF 10 ZCAPLUS COPYRIGHT 2006 ACS on STN
2004:974142 Document No. 142:201370 Synthesis and Electrochemical Properties of Li[Ni1/3Co1/3Mn(1/3-x)Mgx]O2-yFy via Coprecipitation. Kim, G.-H.; Myung, S.-T.; Bang, H. J.; Prakash, Jai; Sun, Y.-K. (Department of Chemical Engineering, Center for Information and Communication Materials, Hanyang University, Seoul, 133-791, S. Korea). Electrochemical and Solid-State Letters, 7(12), A477-A480 (English) 2004. CODEN: ESLEF6. ISSN: 1099-0062. Publisher: Electrochemical Society.
AB The mixed transition metal layered compd., Li[Ni1/3Co1/3Mn(1/3-x)Mgx]O2-yFy was synthesized via copptn. followed by high-temp. heat treatment. XRD showed that this material has a typical layered structure with R3m space group. Spherical morphol. was obsd. by SEM. Mg and F substitutions improved the phys. properties such as crystallinity, morphol., and tap d. The improved phys. characteristics enhanced the capacity, retention, and thermal stability, even for electrodes cycled between 2.8 and 4.6 V.
IT **837287-83-9P 837287-95-3P**
(synthesis and electrochem. properties of Li[Ni1/3Co1/3Mn(1/3-x)Mgx]O2-yFy cathode material for lithium batteries)
RN 837287-83-9 ZCAPLUS
CN Cobalt lithium magnesium manganese nickel fluoride oxide (Co0.33LiMg0.04Mn0.29Ni0.33F0.04O1.96) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	1.96	17778-80-2

F	0.04	14762-94-8
Co	0.33	7440-48-4
Ni	0.33	7440-02-0
Mn	0.29	7439-96-5
Mg	0.04	7439-95-4
Li	1	7439-93-2

RN 837287-95-3 ZCAPLUS
CN Cobalt lithium magnesium manganese nickel fluoride oxide (Co0.33LiMg0.04Mn0.29Ni0.33F0.08O1.92) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	1.92	17778-80-2
F	0.08	14762-94-8
Co	0.33	7440-48-4
Ni	0.33	7440-02-0
Mn	0.29	7439-96-5
Mg	0.04	7439-95-4
Li	1	7439-93-2

IT **837287-83-9P 837287-95-3P**
(synthesis and electrochem. properties of Li[Ni1/3Co1/3Mn(1/3-x)Mgx]O2-yFy cathode material for lithium batteries)

L7 ANSWER 8 OF 10 ZCAPLUS COPYRIGHT 2006 ACS on STN
2004:392154 Document No. 140:393378 Layered cathode materials for lithium ion rechargeable batteries. Kang, Sun-ho; Amine, Khalil (The University of Chicago, USA). U.S. Pat. Appl. Publ. US 2004091779 A1 20040513, 24 pp. (English). CODEN: USXXCO. APPLICATION: US 2003-699484 20031031. PRIORITY: US 2002-423347P 20021101.

AB A no. of materials are disclosed with the compn. Li1+xNiαMnβCoγM'δO2-zFz (M' = Mg,Zn,Al,Ga,B,Zr,Ti) for use with rechargeable batteries, wherein x is between about 0 and 0.3, α is between about 0.2 and 0.6, β is between about 0.2 and 0.6, γ is between about 0 and 0.3, δ is between about 0 and 0.15, and z is between about 0 and 0.2. Adding the above metal and fluorine dopants affects capacity, impedance, and stability of the layered oxide structure during electrochem. cycling.

IT **685867-55-4 685867-56-5**
(layered cathode materials for lithium ion rechargeable batteries)

RN 685867-55-4 ZCAPLUS
CN Aluminum cobalt Lithium manganese nickel fluoride oxide (Al0.01-0.2Co0.01-0.33Li1-1.33Mn0.2-0.67Ni0.2-0.6F0-0.5O1.5-2) (9CI)

(CA INDEX NAME)

Component	Ratio	Component Registry Number
O	1.5 - 2	17778-80-2
F	0 - 0.5	14762-94-8
Co	0.01 - 0.33	7440-48-4
Ni	0.2 - 0.6	7440-02-0
Mn	0.2 - 0.67	7439-96-5
Li	1 - 1.33	7439-93-2
Al	0.01 - 0.2	7429-90-5

RN 685867-56-5 ZCAPLUS
CN Cobalt lithium manganese nickel titanium fluoride oxide (Co0.01-0.33Li1-1.33Mn0.2-0.67Ni0.2-0.6Ti0.01-0.2F0-0.5O1.5-2) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	1.5 - 2	17778-80-2
F	0 - 0.5	14762-94-8
Co	0.01 - 0.33	7440-48-4
Ti	0.01 - 0.2	7440-32-6
Ni	0.2 - 0.6	7440-02-0
Mn	0.2 - 0.67	7439-96-5
Li	1 - 1.33	7439-93-2

IT **685867-55-4 685867-56-5**
(layered cathode materials for lithium ion rechargeable batteries)

L7 ANSWER 9 OF 10 ZCAPLUS COPYRIGHT 2006 ACS on STN
2000:522635 Document No. 133:107448 Secondary nonaqueous electrolyte batteries. Fujiwara, Masashi; Yamada, Shuji (Toshiba Corp., Japan). Jpn. Tokkyo Koho JP 3032757 B1 20000417, 13 pp. (Japanese).
CODEN: JTXXFF. APPLICATION: JP 1999-39762 19990218.
AB Secondary Li batteries use cathodes composed of agglomerated secondary particles of c axis oriented primary LixM1-yM'yFzO2n-z (M = Co, Ni, and/or Mn; M' = Co, Ni, Mn, b, and/or Al; 0.9 ≤x ≤1.1; yr ≤0.5; z ≤0.25, 1 ≤n ≤2) particles having 10 ≤D/r ≤50, where r is the av. length of the primary particles in their shorter direction and D is the diam. of the secondary particle at 50% count on its integrated vol. based particle size distribution curve.
IT **282531-53-7 282531-55-9**
(cathode active mass with controlled primary and secondary

particle size for secondary lithium batteries)
RN 282531-53-7 ZCAPLUS
CN Aluminum cobalt lithium manganese nickel borate fluoride oxide (Al0.02Co0.15Li1.05Mn0.03Ni0.75(BO3)0.02F0.05O1.89) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	1.89	17778-80-2
F	0.05	14762-94-8
BO3	0.02	14213-97-9
Co	0.15	7440-48-4
Ni	0.75	7440-02-0
Mn	0.03	7439-96-5
Li	1.05	7439-93-2
Al	0.02	7429-90-5

RN 282531-55-9 ZCAPLUS
CN Aluminum cobalt lithium manganese nickel borate fluoride oxide (Al0.02Co0.02Li2.01Mn1.92Ni0.02(BO3)0.02F0.04O3.9) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	3.9	17778-80-2
F	0.04	14762-94-8
BO3	0.02	14213-97-9
Co	0.02	7440-48-4
Ni	0.02	7440-02-0
Mn	1.92	7439-96-5
Li	2.01	7439-93-2
Al	0.02	7429-90-5

IT **282531-53-7 282531-55-9**
(cathode active mass with controlled primary and secondary particle size for secondary lithium batteries)

L7 ANSWER 10 OF 10 ZCAPLUS COPYRIGHT 2006 ACS on STN
2000:474465 Document No. 133:107396 Manufacture of secondary nonaqueous-electrolyte batteries. Fujiwara, Masashi; Tatebayashi, Yoshinao; Takami, Norio (Toshiba Corp., Japan). Jpn. Kokai Tokkyo Koho JP 2000195514 A2 20000714, 15 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 1998-367680 19981224.
AB The batteries are equipped with cathodes contg. Li Ni mixed oxides manufd. by the following steps; spray drying of slurries contg. Ni components and Li components dispersed in solvents selected from

water, aq. acidic solns., aq. alk. solns., and org. solvents; firing the dried products in oxidative atm.; heating under pressure in oxidative atm. Resulting Li Ni mixed oxides may have peak width at half height FWHM(003) and FWHM(104) and peak intensity I(104) and I(003) by x-ray diffractometry satisfying FWHM(003)/FWHM(104) = 0.75-0.9 and I(104)/I(003) 0.25-0.9. The batteries have high discharge voltage, charge-ability with large current, and safety.

IT **282117-65-1P**
(lithium nickel oxide manufd. by pressure heating in oxidative atm. for cathodes in batteries)

RN 282117-65-1 ZCAPLUS

CN Aluminum cobalt lithium manganese nickel borate fluoride oxide (Al0.02Co0.15Li1.05Mn0.03Ni0.75(BO3)0.02F0.05O1.94) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	1.94	17778-80-2
F	0.05	14762-94-8
BO3	0.02	14213-97-9
Co	0.15	7440-48-4
Ni	0.75	7440-02-0
Mn	0.03	7439-96-5
Li	1.05	7439-93-2
Al	0.02	7429-90-5

IT **282117-65-1P**
(lithium nickel oxide manufd. by pressure heating in oxidative atm. for cathodes in batteries)